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ANNUAL REPORT OF THE BARBERRY ERADICATION CAMPAIGN, 1927,

WITH SUMMARIZED RESULTS FOR 1918-1927, INCLUSIVE

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ANNUAL REPORT OF THE BARBERRY ERADICATION CAMPAIGN, 1927,
WITH SUMMARIZED RESULTS FOR 1918-1927, INCLUSIVE.

By Lynn D. Hutton, Associate Pathologist in Charge,

and

John W. Baringer, Associate Pathologist, and
State Leader of Barberry Eradication in Ohio

INTRODUCTION

The common barberry is slowly but surely losing its hold in the barberry-eradication area. This area comprises the 13 north-central States of Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming. A campaign for the systematic eradication of all rust-spreading barberries from these 13 States was started in April, 1918, as a cooperative project between the U. S. Department of Agriculture and the Agricultural Colleges and State Departments of Agriculture of these States. The Conference for the Prevention of Grain Rust, composed of agricultural, business, and educational leaders, has cooperated very closely. Local civic organizations have aided materially in furthering the campaign in their communities. Property owners willingly have reported known locations of harmful bushes and have helped to eradicate them.

The idea of barberry eradication as a means of reducing stem-rust losses is not a new one. Campaigns to eradicate rust-spreading barberries have been carried on by many European countries in the last 200 years. As a result of these campaigns in Europe, positive local control has been effected, and, where eradication has been thorough, as in Denmark, control of stem rust has resulted. Laws were passed in Connecticut, Rhode Island, and Massachusetts before 1775 prohibiting the growing of common barberries. Stem rust was not controlled in these States because the laws were not rigidly enforced, but in localities where complete eradication was accomplished, beneficial results followed immediately upon removal of the barberries. Local attempts at eradication in other States had resulted in decreased rust losses, but the widespread influence of adjacent barberries reduced the effectiveness of local eradication.

Necessity for the Barberry Eradication Campaign

As early as 1391 severe local attacks of stem rust had been known in the north-central grain-growing States but, previous to 1904, there had been no widespread and destructive epidemic of stem rust. The season of 1904 was characterized by an epidemic so severe and so widespread that it was of national importance. In 1911 occurred a general but less severe epidemic. This caused a realization that losses from stem rust, even in ordinary years, were large and important. In 1916 came another extremely destructive epidemic which is estimated to have destroyed over 180,000,000 bushels of wheat in the upper Mississippi Valley, besides causing a great loss in Canada.

Grain growing in many sections was becoming unprofitable because of stem rust. In some localities, and even in whole districts, farmers had abandoned wheat growing. Part of these rust losses could be traced directly to the barberry bushes which caused them. Larger epidemics showed evidence of being the result of coalescing local epidemics which were started by barberries. From what we now know of the numbers and distribution of barberries it appears that rust losses as a whole increased about in proportion to the increase in the number of barberries in the north-central States.

Organization of the Eradication Campaign

The demand for relief from increasing losses from stem rust even in ordinary years, and the recurrence of epidemic years, resulted in the legislation against the common barberry and the organization of a campaign to find and destroy it. In 1917 North Dakota began the eradication of her common barberries. Early in 1918 the present organization, cooperative between the U. S. Department of Agriculture and the 13 north-central States, was effected. The campaign was made a project of the Office of Cereal Crops and Diseases of the Bureau of Plant Industry. By the spring of 1919 laws or other regulations prohibiting the growing of barberries had become effective in each of these States.

A State Leader was put in charge of the work in each State. In connection with the supervision of the campaign he made contacts with all of the cooperating State agencies. Under the general direction of the National Leaders he supervised the following four phases of the campaign: Investigations, surveys, eradication, and publicity and education. Each Leader directed a corps of field men in carrying out these phases of the campaign. Collaborators, cooperators, and agents from the agricultural colleges, extension divisions, and experiment stations aided further in the investigational, survey, publicity, and educational activities.

In the nine years of the campaign to December 31, 1926, more than 14,300,000 common barberry bushes were eradicated. On that date all but 57 of the 920 counties necessary to survey had been covered by the first, or preliminary survey. However, only 209 counties had been covered by the second or more intensive survey. In addition to the remaining second survey, hundreds of areas of escaped bushes remained to be cleared, and continued resurveys over the entire area were needed to find and eradicate seedlings and sprouting bushes.

PROGRESS DURING 1927

While the funds for the campaign became available at the beginning of the fiscal year each July, enough money is set aside each fall to adequately finance spring activities, so that the work done during 1927 represents approximately the progress that has been made with the appropriation of one fiscal year. This amount includes \$375,000 of the Federal appropriation and approximately \$88,000 in aid furnished in cash and services by the States and other cooperative agencies.

Again, during 1927, the activities of the campaign were directed along the four major lines (1) investigations, (2) surveys, (3) eradication, and (4) publicity and education.

Investigations

The activities under the investigational phase of the campaign have included (1) stem-rust epidemiology studies, (2) classification of *Berberis* and other closely related genera, (3) the inoculation of barberry species, varieties and hybrids with stem rust, and (4) studies in connection with the problem of chemical eradication.

Stem Rust Epidemiology Studies

Studies of stem-rust epidemiology were continued in 1927, as formerly, under the direction of Dr. E. C. Stakman, University Farm, St. Paul, Minn. These investigations consisted of efforts to determine the sources of stem rust and the time of its first appearance on barberries and on grains and grasses at various latitudes. The degree of prevalence and the relative maturity of the rust on barberries were observed as the season progressed. At the same time, notes were made on the prevalence and severity of stem rust on grains and grasses near barberries in comparison with the amount of stem rust on grains and grasses growing far from the known location of barberries. The maximum extent of spread of stem rust from barberries to grain was recorded and estimates were made of resulting reduction in yields. An attempt was then made to correlate the relation of such local epidemics to the general stem-rust situation within individual States. The contribution of stem rust from various States or parts of States to more widespread interstate epidemics was determined as far as possible.

In addition, seasonal collections of samples of rusted barberry leaves and of rusted grain straw were made in many States from Texas north to Canada, and from Ohio west to Montana for the purpose of determining the distribution and prevalence of physiologic forms of stem rust. These data furnished considerable information on the phywiologic-form population in each area and on the movement of stem rust from one part of the United States to another during the growing season.

Comparison of stem-rust epidemiology data for any given year with similar data obtained in any previous year or in any group of previous years, has supplied a means of determining the effect which the eradication of barberries is having in eliminating severe local epidemics. An idea of the probable effect of the destruction of large numbers of barberries in reducing the frequency and ultimate severity of widespread stem-rust epidemics also can be obtained by such comparison.

Dr. Stakman is assisted in this phase of the work by the stem-rust and eradication personnel of the Office of Cereal Crops and Diseases. Dr. H. B. Humphrey, Senior Pathologist in Charge of Rust Investigations, furnished very valuable aid in gauging the rust situation. The collaborators and cooperators in each of the barberry eradication States, and cooperators in other States and Canada, have supplied comparable data. Each State Leader and his corps of field men furnished specimens of infected barberries and grains and grasses. Specially trained field men inspected and mapped local rust spreads. The estimates furnished by the Office of Mycology and Disease Survey, Bureau of Plant Industry, U. S. Department of Agriculture, are indispensable in summarizing the general annual stem-rust situation.

The success which has been attained in curbing severe local stem-rust epidemics, that arise from time to time on grains near barberries, by the destruction of such bushes is one of the most reassuring accomplishments of the campaign. Hundreds of cases are on record in the States of the eradication area where stem rust has been found spreading from barberries to grain. These local spreads often have been reported by farmers and studied later by the field agents. Invariably such local spreads have been eliminated and the volume of rust in each community has been reduced, by the destruction of these rust sources. Barberry eradication has more than paid its way, in its entirety, by the control of local epidemics during the past ten years.

In 1927, considerable damage from stem rust occurred in some districts of the hard-spring-wheat States. This epidemic caused some doubt as to the effectiveness of the barberry-eradication campaign. In discussing this epidemic it is essential that everyone should realize that 1927 was an abnormal season. Spring grain, especially wheat, matured from 10 to 20 days later than usual, because of late seeding and unfavorable weather conditions. Precipitation was abnormally heavy over much of the area and was distributed generally throughout the growing season. With a delayed crop, a large amount of moisture in the soil, heavy dews, hot weather during the latter part of July, and the pronounced succulency of the grain plants, the season was extremely favorable for a terrific rust epidemic. An outstanding feature of the epidemic was the belated appearance of the rust. This is a most important point. This delayed development of stem rust in large quantities is exactly what one would expect after more than 14,000,000 barberry bushes had been removed. Unfortunately, the millions of barberries remaining in May and June, 1927, were infected. The spores produced by these bushes, though less abundant than in former years, because of the number of bushes destroyed, had two weeks longer in which to multiply and spread, due to the late harvest. The complete eradication of these remaining barberry bushes will reduce the initial amount of rust in the spring and early summer. The rust will start later, if at all, and in a normal season grains should escape damage. The epidemic of 1927, rather than being a discouraging factor, should give encouragement to those interested in barberry eradication.

Classification of Barberry Species, Varieties, and Hybrids

A collection of *Berberis* for experimental purposes is maintained at Bell, Maryland. Additions have been made to the collection from time to time as rare or new species, varieties, or hybrids become available. The study, classification, description, and illustration of this collection has been carried on cooperatively by the Office of Horticulture and the Office of Cereal Crops and Diseases by Mr. B. Y. Morrison, Associate Horticulturist. Following is a brief summary of Mr. Morrison's report for 1927:

"The work at Bell Station for this year has chiefly concerned itself with the addition of data to those already collected for the proposed monographic survey of the genus *Berberis*. The plants secured from seed in 1925 are now coming into mature character of leaf but few have produced bloom. Those from later seed collections are still in juvenile stages of development. The proposed plan includes a sheet of drawings for every species and as many garden forms as may be desirable, on which will be shown every stage in the plant's life from its germination to its fruiting. There are over one hundred such sheets in progress to date. Only about ten are complete at the end of this season.

"The only important addition to the collection this year has been *Berberis bergmanniana* var. *acanthophylla* from seed received from Golden Gate Park, San Francisco, California.

"In propagation, it has been found that the Japanese barberry makes a suitable stock on which to graft a wide range of species. By this method it will be possible hereafter to supply identical material which will make a larger plant in a short time than any plant raised from a cutting. The experimental supply grafted in the winter of 1926 will go to St. Paul this winter, after being grown in the nursery this summer."

Inoculation of Barberry Species, Varieties, and Hybrids with Stem Rust

All species and strains of barberry and Mahonia, not positively known to be either susceptible or resistant to stem rust, are being assembled and tested for susceptibility to the several varieties and physiologic forms of black stem rust. These investigations are being carried on at the University Farm, St. Paul, Minn. The results obtained show which of the numerous species and varieties of barberries are immune from stem rust and may safely be planted in the eradication area. This work was started by Dr. E. C. Stakman and Dr. M. N. Levine. Since 1925 it has been carried on by Mr. R. U. Cotter. During 1927, seven additional species and varieties were found to be susceptible to stem rust. Several other species and varieties appeared to be immune but these will be given additional inoculations to positively determine their immunity.

The investigation of the correlation between resistance to puncture of barberry leaves and susceptibility to or immunity from stem rust is being continued by Mr. L. W. Melander, State Leader in Minnesota, and Mr. Cotter at the University Farm, St. Paul, Minn.

Studies in Connection with the Problem of Chemical Eradication

The chemical studies which were carried on from 1921 to 1925, inclusive, by Dr. W. W. Robbins, Mr. N. F. Thompson, and Dr. E. R. Schulz determined definitely that of the more than 40 chemicals tried, salt and kerosene are the most satisfactory for use in killing barberries. This determination was based upon the effectiveness, availability, and cost of the chemicals, ease of handling, danger in application, and danger in killing animals which have access to the treated bushes.

However, in the use of these chemicals, other studies have been carried on by the State Leaders in barberry eradication. During 1927 the proper amounts of salt and kerosene to produce killing under varying soil, humidity, and topographic conditions have been studied in each State. A preliminary experiment was started in 1927 in Geauga County, Ohio, for the purpose of securing additional data as to the effectiveness of several different methods of application, and of varying amounts of salt and kerosene.

In view of the importance of seedling eradication, an experiment was started in Ohio by Mr. John W. Baringer, State Leader in that State, in 1926, and was continued in 1927, to determine the effect on barberry seedlings of a single uniform dosage and repeated annual dosages of kerosene and of a saturated solution of common salt. Somewhat similar experiments were started by Mr. Walter F. Reddy, State Leader in Michigan, in the fall of 1926 and were continued during 1927. These experiments also may show the probable effect of these dosages on ungerminated barberry seeds which are so often found near the base of old barberry bushes. The present indications are that some very valuable information will be obtained from these experiments. Incidentally, considerable data will be obtained on the natural persistence or mortality of seedlings in untreated experimental check plots.

Surveys

Four orders of survey now are in progress in different parts of the barberry eradication area. These are (1) first survey, (2) resurvey, (3) second survey, and (4) combined resurvey and second survey.

A first survey is the first property-to-property survey of all of the cities, towns, and villages, and a farm-to-farm survey of all of the rural districts in a given territorial unit.

A resurvey is a thorough reinspection of all properties on which barberry bushes or seedlings previously were found and destroyed. Its primary purpose is the destruction of all sprouts or seedlings which have appeared since the preceding survey. It also accomplishes the destruction of any bushes which were missed on these properties during the previous survey. Resurveys subsequent to the first resurvey have the same purpose and are called second resurvey, third resurvey, etc.

A second survey is the second property-by-property survey of all of the cities, towns, and villages, and the second farm-to-farm survey of all the rural districts in a given territorial unit.

A combined second survey and resurvey is one in which these two surveys may be carried on together advantageously and economically. Such a combined survey is advantageous under two conditions: (1) The resurvey of a property may indicate the necessity of a second survey of adjoining properties within a sufficiently wide radius to insure the finding of all barberry bushes which may have escaped from any original planting. (2) A second survey of a territorial unit frequently involves the reinspection of properties upon which barberries previously have been found and destroyed.

Four methods of survey have been used in the barberry-eradication campaign. These are (1) the intensive method, (2) the modified-intensive method, (3) the farmstead method, and (4) the road method.

The intensive method is a foot-by-foot inspection of every property in an entire civil township or larger territorial unit. This is one of the two methods used in the first survey and the second survey, beginning in 1925.

The modified-intensive method is a thorough inspection of all farmsteads (including houseyard, garden, orchard, and barnyard) and windbreaks, nearby fence rows, adjacent woods, and such other nearby places as may be expected to harbor barberries. This method differs from the intensive-survey method in that natural timber, far removed from home sites, is given only a cursory inspection. Whenever barberries are found on this survey a foot-by-foot survey is made in every direction for a distance of two miles from the last fruiting barberries found. This method of survey is most commonly used on second survey.

In the farmstead method, the farmyards only are carefully inspected. No inspection is made of adjacent groves, orchards, windbreaks, fence rows, etc., unless fruiting barberries are found on the farmstead. This method is the one which commonly was used on the first survey. It is used only to a limited extent on the second survey.

In the road method, farmsteads were not inspected unless barberry bushes, or bushes believed to be common barberries, could be seen from the road. This method was used in a few of the States at the beginning of the first survey, but it was discontinued because of its inefficiency.

First Survey

The greater part of the area which it seemed necessary to cover by first survey was completed before 1925. Until the end of 1924, the farmstead method was used on first survey. Beginning with 1925 either the intensive or the modified-intensive method was adopted and continued during the period from 1925 to 1927, inclusive. Naturally the adoption of these more intensive methods resulted in a decrease in the area covered each year but resulted in an increase in survey efficiency.

The first survey is nearing completion. Approximately 882 of 920 counties necessary to survey were covered by December 31, 1927. In 1927, first survey remained to be done only in Illinois, Michigan, Montana, and Ohio. Some first survey was done in each of these States in 1927. Of the first survey completed in 1927, some was done by the intensive method. In other places, the modified-intensive method was used. There are a number of local factors to be considered in determining the method of survey to be used in each district. Some of these factors are general barberry population, small-grain production, sparsity of settlement, humidity, topography, soil type, and timber growth.

Second Survey

The second survey is made for the purpose of finding barberries which may have escaped observation on the first survey, bushes which have grown from seeds since the first survey, and to detect new barberries which may have been brought in from States outside of the eradication area. The intensive and modified-intensive methods of survey are in most common use on second survey. The intensive method is recommended but in some counties conditions exist which make the use of the modified-intensive method the more preferable. The second survey of cities and towns is carried on simultaneously with the second rural survey.

Wherever second survey is in progress the probable extent and efficiency of the first survey is considered. Special attention is given to the extent and number of infested properties found on the first survey, the time of introduction of barberries, the local stem-rust history, and the existing ecological factors which influence the natural spread and growth of barberry bushes, sprouts, and seedlings.

Progress on second survey necessarily is much slower than that of first survey in the same counties. However, the results obtained by the more intensive survey completely justify the additional expenditure of money. During 1927, approximately 25.5 counties were covered in second survey. A total of 235 counties has been surveyed a second time during the entire campaign. A total of 107,093 original bushes and seedlings was found on 1,030 properties on second survey in 1927. Since the beginning of the second survey in 1922, a total of 472,140 original bushes and seedlings has been found on 4,537 properties.

Resurvey

Approximately 43 counties were covered by the resurvey in 1927. Resurveys are carried on only when it is apparent that a county will not be covered by the next complete survey soon enough to prevent sprouting bushes and seedling bushes from bearing seeds. As a rule, resurveys follow the preceding surveys in about four years. Additional resurveys follow after about five years. In 1927, a total of 5,899 sprouting bushes and 26,672 seedlings were found on 466 properties on the resurvey. Sprouting bushes totaling 6,203 and 26,697 seedlings were destroyed on 469 properties.

Eradication

It has been shown conclusively during the past five years that both salt and kerosene are very effective as killing agents for barberry bushes. The relatively few bushes not killed by the treatments of salt or kerosene were found to have been improperly treated or were treated with too small a quantity of the chemical. Since the use of chemicals was started in 1921 there has been a noticeable decrease in the number of sprouting bushes found each year. In 1923, before the results of chemical eradication were included, 106,700 sprouting bushes were found. The comparable figure for each following year has been materially less, although equally as many previously-destroyed bushes were inspected on resurvey. In 1927 only 5,399 sprouting bushes were found.

In the calendar year 1927, 793.56 tons of salt and 1,284.5 gallons of kerosene were applied to 1,630,922 original bushes, sprouting bushes, and seedlings on 1,539 properties. A total of 74,424 original bushes, sprouting bushes, and seedlings was dug or pulled from 1,007 properties in the course of all surveys during the year. The total number eradicated by both methods in 1927 was 1,705,346 original bushes, sprouting bushes, and seedlings.

Escaped Barberries and Seedlings

One of the biggest problems of the campaign is the thorough clean-up of numerous areas of escaped bushes and seedlings which have been found. A mid-sized common barberry produces approximately 23,000 seeds each year. A large proportion of these seeds are viable. Seeds from the thousands of old fruiting barberries have been scattered by birds to adjacent groves and orchards, fence rows, brushy pastures, thickets, stream banks, and woodlands of every type. Bushes have been found growing in the crevices of precipitous cliffs, in abandoned stone quarries, in dense thickets of wild currants, gooseberries, and plums, under tangled arbors of clematis, wild grapes, and poison ivy, among second growth timber, and in marshes and swamps. There seems to be no situation except deep water where barberries will not grow. Because of the difficulty of eradication under these conditions, the clean-up of the areas of escaped bushes is extremely slow.

An effort was made in 1927 to find and destroy every escaped barberry in the areas being surveyed. Foot-by-foot surveys were carried on in all such areas of escaped bushes. The survey in each area is extended at least two miles beyond the limits of the last fruiting escaped bush in order to insure that the outer edges of the area have been found.

Seedlings continue to appear every spring near the locations of bushes previously destroyed indicating that barberry seeds lying on the ground retain their viability as long as 8 years. With the knowledge obtained through previous years of experience, surveys are being made of areas of escaped bushes and seedlings every 5 years so that these surveys will find and destroy the bushes before they have begun to produce fruit. By this method of preventing bushes from fruiting, it will be possible to check the further spread of barberries and eventually to kill all bushes that may be produced from seeds now lying on the ground.

One of the outstanding areas of escaped bushes found since the beginning of the campaign was surveyed in Geauga County, Ohio, in 1927. This particular area is only 60 acres in size, but in 1927 approximately 35,000 large barberries and 800,000 seedlings were found and destroyed in it.

In 1927, a total of 1,675,239 escaped bushes and seedlings was found as compared with 7,416 planted bushes. During the entire campaign 13,203,538 escaped bushes and seedlings have been found. A majority of the areas in which escaped bushes and seedlings have been found still have some bushes and seedlings in them and must have at least one, and, in many cases, a number of additional surveys before they will be entirely cleared of barberries.

Publicity and Education

The job of telling the barberry and stem-rust story to the more than 32,000,000 people in the eradication area is twofold in nature. Some information must accompany the surveys to acquaint the public with the purpose and progress of the campaign. This is the publicity phase. Its purpose is to reach the public quickly and to secure immediate support and cooperation for the work. Materials designed to teach the public how to identify both the common barberry and stem rust are part of all publicity. Items of local interest are given local emphasis. Intensive use is made of news articles, lantern-slide series, exhibits, demonstrations, window displays, and roadside signs. Talks by leaders and specially trained field men are made at local gatherings. Many of these talks are supplemented with lantern-slide series and small demonstrations. Area and State problems and progress also are shown by news articles, motion pictures, bulletins, circulars, posters, colored plates, and circular letters. In 1927, every effort was made to improve the quality of publicity disseminated. Demonstrations were analyzed and improved. Newspaper articles were more carefully written, and better illustrated. Bulletins, circulars, and colored plates were more judiciously distributed. As a result, the total amount of publicity accomplished during the year was slightly less than in some previous years but its effectiveness was considerably increased. As a result, more complete public cooperation was obtained.

The educational phase is designed to teach the children of the present and future generations how to recognize the common barberry so that they can carry on the work through a real knowledge of the cause of black stem rust and the damage that it does. This educational phase is being carried on through the schools and through children's organizations. The closest cooperation has been given by State superintendents of public instruction in most of the States. County superintendents of schools and local teachers are aiding in most of the counties. State universities, colleges, normal schools, and teachers' colleges are aiding by teaching their students, some of whom will be the teachers of tomorrow, to properly present this important scientific subject. Teachers in all of the schools are being furnished lesson plans, Federal and State bulletins and circulars, specimens of the common barberry and rusted straw, and such other materials as will aid them in teaching their pupils the story of stem rust and the common barberry.

The students are learning the real source of black stem rust and the characteristics of the common barberry. With this knowledge they will be able, in the future, not only to recognize and destroy common barberries but to prevent the re-establishment of these plants in their communities. The educational phase also has some immediate results. Numbers of barberry plantings have been found and reported by school teachers and school children. Some of these plantings are so situated that they would not have been found for years by the field agents, and would have produced millions of seeds before being destroyed on the regular surveys.

Much of the credit for the effectiveness of the publicity and educational activities in 1927 is due to the cooperative agency, The Conference for the Prevention of Grain Rust, which has its headquarters at Minneapolis, Minn. Through the efforts of its secretary, Mr. Donald G. Fletcher, this organization furnished nearly all of the colored materials used in the publicity and educational work this year. The Conference has supplied much of the demonstration material, such as window display sets and special fair-demonstration attractions. Through the efforts of Mr. Fletcher, each State Leader has been furnished with newspaper cuts with which to illustrate news articles about the various phases of the campaign, and with microscope slides to be used in connection with the study of stem rust and the common barberry in high schools and colleges.

In 1927, the U. S. Department of Agriculture distributed 295,407 copies of bulletins, circulars, posters, lesson plans, circular letters, return post cards, and other pieces of printed matter in furthering the publicity and educational activities. The Conference for the Prevention of Grain Rust printed and distributed 632,201 pieces and the cooperating States 75,670 pieces. A total of 1,003,278 pieces was distributed in furthering the campaign in 1927.

Following is a summary of the publicity and educational materials furnished and distributed by the U. S. Department of Agriculture, The Conference for the Prevention of Grain Rust, and the 13 cooperating States from the beginning of the campaign to December 31, 1927.

Publicity and educational matter furnished and distributed by the U. S. Department of Agriculture, The Conference for the Prevention of Grain Rust, and the 13 cooperating States in furthering the barberry-eradication campaign.

For the period from April 1, 1918, to December 31, 1927,
inclusive

Kind of Material	U.S.D.A.	Conference	States	Totals
Bulletins and Circulars	1,733,000	1,167,670	511,370	3,412,040
Posters	350,255	189,205		539,460
Colored Plates	20,000	575,817		595,817
Loss Statements		273,648		273,648
Lesson Plans	67,000			67,000
Circular Letters	166,500	150,695		317,195
Return Cards	33,000	310,200		343,200
Mimeographed Circulars	3,000			3,000
Mimeographed Radio Talks	16,000			16,000
Barberry Specimen Envelopes ^{1/}		150,186		150,186
Hang-Me-Up Cards	15,000			15,000
Cross Word Puzzle		3,000		3,000
Dodgers		72,350		72,350
Straw Sample Cards	25,000			25,000
Calendar Cards		60,000		60,000
Reprints of Newspaper Articles		23,350		23,350
Official Personnel Lists, etc.		48,500		48,500
Miscellaneous		154,520		154,520
Totals	2,428,755	3,179,141	511,370	6,119,266

^{1/} Barberry Specimens for Specimen Envelopes furnished by U. S. D. A.

SUMMARIZED RESULTS

Summary for 1927

During the calendar year 1927 approximately 19 counties were covered in first survey and approximately 25.5 counties were given a second survey. In resurvey, about 43 counties were covered.

Original bushes numbering 207,446 were found on 1,952 properties and 223,859 original bushes were destroyed on 2,127 properties. These totals include 39,837 original bushes found on 1,030 properties in second survey. In resurvey 5,899 sprouting bushes were found and 6,203 were eradicated. Seedlings totaling 1,475,209 were found and 1,475,284 were destroyed in the first survey, second survey, and resurveys.

During the calendar year a grand total of 1,633,554 original bushes, sprouting bushes, and seedlings were found and 1,705,346 original bushes, sprouting bushes, and seedlings were destroyed in all surveys.

Summary of Results from 1918 to 1927, Inclusive

In the 10 years of the campaign from April 1, 1918, to December 31, 1927, an area equivalent to approximately 382 counties has been covered in the first survey of cities, towns, and farmsteads. Approximately 38 counties remain to be done. The first survey of nearly all cities in the entire 13 States has been completed. Of the counties already covered by first survey, approximately 235 have been surveyed a second time. These comprise about one-fourth of the total number of counties. In conducting the resurvey it has been necessary to revisit the properties in approximately all counties covered by the first or second surveys to June 30, 1925.

Original bushes numbering 6,912,869 have been located on 76,957 properties in all three surveys. Of these, 6,910,453 bushes have been destroyed on 76,813 properties. In resurvey 312,703 sprouting bushes were found on 13,917 properties. In all surveys, 8,846,836 seedlings were found and 8,843,550 were destroyed. These numbers include 183,061 bushes and 284,079 seedlings found, and 183,055 bushes and 284,079 seedlings destroyed, on second survey.

This makes a grand total of 16,072,408 original bushes, sprouting bushes, and seedlings found, and 16,066,444 original bushes, sprouting bushes, and seedlings destroyed, in all three surveys during the entire campaign.

Credit is hereby gladly given to State Leaders, collaborators, and agents who have supplied data, to Mr. H. E. Clark, who has compiled, summarized, and tabulated them, and to others who have aided in the preparation of this report.

FIRST SURVEY, PROPERTIES, January 1 to December 31, 1927

Table 1. Data showing, by States, the number of properties on which barberry bushes were found and destroyed in all surveys, and the number of properties upon which seedlings were found and destroyed in the first and second surveys during the calendar year January 1 to December 31, 1927

State	Number of : Number of properties on which				Total number of proper- : Number of properties on which				seedlings were -			
	counties :	bushes were found :	In country :	Total in :	ties cleared of bushes :	Found :	Destroyed :	Found :	Dug :	Treated :	Total :	
	covered in :	In cities :	towns :	cities :	Dug :	Treated :	Total :	Dug :	Treated :	Total :		
Colorado	0 :	12 :	22 :	35 :	2 :	33 :	35 :	1 :	0 :	1 :	1 :	1
Illinois	300 :	251 :	205 :	544 :	304 :	240 :	544 :	76 :	54 :	22 :	76 :	76
Indiana	0 :	15 :	30 :	65 :	43 :	39 :	82 :	7 :	4 :	5 :	9 :	9
Iowa	0 :	46 :	105 :	217 :	42 :	175 :	217 :	77 :	27 :	50 :	77 :	77
Michigan	169 :	54 :	168 :	348 :	287 :	207 :	494 :	98 :	13 :	35 :	98 :	98
Minnesota	0 :	10 :	33 :	57 :	12 :	45 :	57 :	40 :	6 :	34 :	40 :	40
Montana	554 :	17 :	17 :	43 :	30 :	16 :	46 :	11 :	10 :	1 :	11 :	11
Nebraska	0 :	7 :	23 :	69 :	3 :	66 :	69 :	9 :	4 :	5 :	9 :	9
North Dakota	0 :	14 :	0 :	37 :	5 :	32 :	37 :	1 :	0 :	1 :	1 :	1
Ohio	849 :	64 :	145 :	260 :	95 :	170 :	265 :	79 :	11 :	68 :	79 :	79
South Dakota	0 :	9 :	11 :	44 :	5 :	39 :	44 :	4 :	1 :	3 :	4 :	4
Wisconsin	0 :	11 :	194 :	233 :	42 :	195 :	237 :	62 :	32 :	30 :	62 :	62
Wyoming	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0
Total	13,72 :	510 :	953 :	1,952 :	370 :	1,257 :	2,127 :	465 :	162 :	305 :	467 :	467

FIRST SURVEY, BUSHES AND SEEDLINGS, January 1 to December 31, 1927

Table 2. Data showing, by States, the number of barberry bushes found and destroyed in all surveys, and the number of seedlings found and destroyed in first and second surveys during the calendar year January 1 to December 31, 1927

State	Number of bushes found--			Number of bushes destroyed:			Number of seedlings			
	In cities and towns:	In country:	Escaped:	Total:	Dug:	Treated:	Found:	Dug:	Treated:	Total
Colorado	25:	379:	330:	405:	3:	402:	3,750:	0:	3,750:	3,750
Illinois	2,190:	12,489:	12,950:	15,140:	4,716:	10,424:	26,384:	18,528:	8,356:	26,384
Indiana	24:	203:	262:	286:	32:	239:	4,395:	3,297:	1,173:	4,470
Iowa	379:	3,526:	4,562:	5,241:	245:	4,996:	13,157:	1,755:	11,402:	13,157
Michigan	338:	99,618:	100,465:	100,803:	12,053:	99,589:	454,086:	3,930:	450,106:	454,086
Minnesota	64:	906:	980:	1,044:	64:	980:	3,414:	1,176:	2,238:	3,414
Montana	71:	147:	233:	304:	388:	107:	14,169:	13,350:	319:	14,169
Nebraska	16:	433:	693:	714:	257:	457:	2,322:	190:	2,132:	2,322
North Dakota	92:	0:	322:	414:	53:	361:	10:	0:	10:	10
Ohio	164:	60,013:	60,231:	60,445:	278:	60,110:	922,660:	251:	922,409:	922,660
South Dakota	124:	111:	215:	339:	15:	324:	941:	753:	138:	941
Wisconsin	21:	22,200:	22,290:	22,311:	2,507:	24,604:	29,421:	3,536:	20,335:	29,421
Wyoming	0:	0:	0:	0:	0:	0:	0:	0:	0:	0
Total	3,508:	200,030:	203,938:	207,446:	20,966:	202,893:	223,359:	1,475,209:	52,366:	1,475,234

FIRST SURVEY, PROPERTIES, April 1, 1918, to December 31, 1922

Table 3. Data showing, by States, the number of properties on which barberry bushes were found and destroyed in all surveys, and the number of properties upon which seedlings were found and destroyed in first and second surveys, April 1, 1918, to December 31, 1927

State	Number of properties on which bushes were found--			Total number of proper-:ties cleared of bushes :			Number of properties on which seedlings were--					
	: counties :	: covered by:In cities:Having :	: In country :	: Total :	: cities & :	: country :	: Dug :	: Treated: Total :	: Found :	: Dug :	: Treated: Total :	: Destroyed :
: original : and towns:escaped: Total :	: bushes :	: survey :	:	:	:	:	:	:	:	:	:	:
Colorado	31.49:	1,572:	92:	211:	1,783:	1,655:	125:	1,780:	110:	19:	91:	110
Illinois	77.00:	11,207:	1,483:	3,584:	14,791:	12,363:	1,923:	14,791:	336:	256:	80:	336
Indiana	92.00:	3,713:	393:	1,372:	5,085:	4,542:	540:	5,082:	128:	59:	69:	128
Iowa	99.00:	7,154:	961:	3,028:	10,182:	9,137:	1,043:	10,180:	379:	157:	222:	379
Michigan	65.09:	5,175:	2,179:	6,012:	11,187:	9,304:	1,809:	11,113:	308:	547:	261:	303
Minnesota	87.00:	3,188:	584:	2,164:	5,352:	4,952:	400:	5,352:	479:	395:	34:	479
Montana	43.70:	227:	52:	143:	370:	301:	65:	366:	37:	31:	6:	37
Nebraska	93.00:	3,220:	174:	894:	4,114:	3,696:	418:	4,114:	77:	36:	41:	77
North Dakota	53.00:	563:	1:	370:	933:	776:	157:	933:	12:	1:	11:	12
Ohio	87.14:	7,392:	1,246:	3,408:	11,500:	9,354:	1,417:	11,281:	920:	469:	451:	920
South Dakota	69.00:	513:	160:	731:	1,244:	824:	420:	1,244:	101:	87:	14:	101
Wisconsin	71.00:	7,055:	1,674:	3,471:	10,526:	9,101:	1,388:	10,489:	523:	277:	238:	515
Wyoming	3.12:	75:	1:	15:	90:	86:	2:	83:	7:	7:	0:	7
Total	881.54:	51,554:	9,000:	25,403:	76,957:	67,101:	9,712:	76,813:	3,917:	2,341:	1,563:	3,909

FIRST SURVEY, BUSHES AND SEEDLINGS, April 1, 1918, to December 31, 1927

Table 4. Data showing, by States, the number of barberry bushes found and destroyed in all surveys, and the number of seedlings found and destroyed in first and second surveys, April 1, 1918, to December 31, 1927

State	Number of bushes found--			Number of bushes destroyed ;			Number of seedlings--				
	In cities and towns:	Escaped :	Total :	Total :	Dug :	Treated:	Total :	Found :	Dug :	Treated :	Total :
Colorado	19,706:	3,291:	5,504:	25,210:	23,920:	1,286:	25,206:	8,028:	712:	7,316:	8,028:
Illinois	115,571:	225,651:	270,006:	385,577:	198,664:	186,912:	385,577:	2,167,293:	463,800:	1,703,493:	2,167,293:
Indiana	77,345:	104,328:	119,627:	197,472:	92,127:	95,339:	197,466:	18,768:	3,476:	15,292:	18,768:
Iowa	651,456:	69,502:	157,947:	809,403:	774,532:	34,875:	809,397:	187,116:	32,357:	154,749:	187,116:
Michigan	54,431:	531,117:	613,526:	668,007:	379,181:	287,920:	667,101:	3,321,590:	1,445,122:	1,876,468:	3,321,590:
Minnesota	592,772:	85,595:	197,733:	790,510:	780,884:	9,626:	790,510:	56,836:	25,420:	31,416:	56,836:
Montana	7,056:	2,105:	4,906:	11,962:	10,435:	1,466:	11,951:	19,223:	16,459:	2,764:	19,223:
Nebraska	73,135:	8,393:	25,290:	93,425:	91,422:	7,003:	93,425:	15,628:	5,309:	10,319:	15,628:
North Dakota	14,640:	150:	8,537:	23,227:	19,903:	3,324:	23,227:	293:	150:	143:	293:
Ohio	219,738:	152,751:	172,125:	391,913:	250,645:	140,546:	391,191:	1,627,363:	124,533:	1,503,228:	1,627,363:
South Dakota	23,870:	21,354:	37,021:	60,891:	49,100:	11,791:	60,891:	27,732:	24,112:	3,620:	27,732:
Wisconsin	281,264:	3,152,514:	3,164,832:	3,446,096:	3,353,184:	92,320:	3,445,504:	1,396,413:	175,083:	1,218,044:	1,396,413:
Wyoming	3,947:	1:	229:	4,176:	3,972:	35:	4,007:	53:	53:	0:	53:
Total	2,135,531:	4,356,752:	4,777,338:	6,912,569:	6,035,069:	775,334:	6,910,453:	8,346,836:	2,316,598:	6,526,952:	8,343,550:

SECOND SURVEY, PROPERTIES, JANUARY 1 TO DECEMBER 31, 1927

Table 5. Data showing, by States, the number of properties on which barberry bushes and seedlings were found and destroyed on second survey in the barberry eradication campaign during the calendar year January 1 to December 31, 1927

State	Number of: counties surveyed	Number of properties on which bushes were found--		Total number of proper- ties cleared of bushes		Number of properties on which seedlings were--		
		In country	Total in cities & country	Dug	Treated: Total	Found	Dug	Treated: Total
Colorado	1.05:	12:	22:	34:	34:	1:	0:	1:
Illinois	1.82:	190:	253:	443:	442:	72:	51:	21:
Indiana	.35:	4:	39:	43:	50:	5:	2:	3:
Iowa	5.05:	9:	111:	120:	104:	16:	3:	8:
Michigan	.25:	1:	6:	7:	4:	2:	2:	0:
Minnesota	2.10:	4:	20:	24:	16:	5:	3:	2:
Montana	.05:	0:	0:	0:	0:	0:	0:	0:
Nebraska	6.50:	7:	63:	69:	66:	9:	4:	5:
North Dakota	2.25:	14:	13:	32:	23:	1:	0:	1:
Ohio	0:	0:	0:	0:	0:	0:	0:	0:
South Dakota	3.55:	5:	32:	37:	35:	4:	1:	3:
Wisconsin	1.25:	10:	206:	216:	180:	53:	29:	29:
Wyoming	.60:	0:	0:	0:	0:	0:	0:	0:
Total	25.32:	256:	774:	1,030:	710:	173:	100:	73:

SECOND SURVEY, BUSHES AND SEEDLINGS, January 1 to December 31, 1927

Table 6. Data showing, by States, the number of barberry bushes and seedlings found and destroyed on second survey in the barberry eradication campaign during the calendar year January 1 to December 31, 1927

State	Number of bushes found--			Number of bushes destroyed			Number of seedlings--				
	In cities	In country	Escaped	Total	Dug	Treated	Total	Found	Dug	Treated	Total
	and towns										
Colorado	25:	376:		402:	3:	399:	402:	3,750:	0:	3,750:	3,750
Illinois	1,670:	11,028:		13,075:	3,830:	9,245:	13,075:	25,021:	16,685:	8,336:	25,021
Indiana	5:	156:		192:	41:	166:	207:	1,418:	260:	1,158:	1,418
Iowa	24:	1,813:		3,011:	45:	2,966:	3,011:	4,383:	1,533:	2,805:	4,383
Michigan	3:	329:		332:	13:	322:	335:	745:	695:	50:	745
Minnesota	12:	61:		104:	9:	95:	104:	301:	98:	203:	301
Montana	0:	0:		0:	0:	0:	0:	0:	0:	0:	0
Nebraska	10:	438:		714:	257:	457:	714:	2,322:	190:	2,132:	2,322
North Dakota	92:	0:		185:	28:	157:	185:	10:	0:	10:	10
Ohio	0:	0:		0:	0:	0:	0:	0:	0:	0:	0
South Dakota	55:	36:		168:	2:	166:	168:	561:	440:	121:	561
Wisconsin	20:	21,602:		21,701:	591:	21,110:	21,701:	23,690:	2,356:	20,334:	28,690
Wyoming	0:	0:		0:	0:	0:	0:	0:	0:	0:	0
Total	1,902:	35,839:		39,887:	4,819:	35,068:	39,902:	67,206:	28,307:	38,899:	67,206

Table 7. Data showing, by States, the number of properties on which barberry bushes and seedlings were found and destroyed on second survey in barberry eradication campaign from January 1, 1922, to December 31, 1927

State	Number of properties on which bushes were found--		Total number of proper- ties cleared of bushes		Number of properties on which seedlings were--	
	Number of counties surveyed	In country Having and towns: escaped bushes	Total in cities & country:	Treated: Dug	Found	Dug Treated: Total
Colorado	22.14:	25:	69:	11:	83:	94:
Illinois	6.67:	512:	633:	654:	491:	1,145:
Indiana	10.20:	192:	137:	222:	106:	328:
Iowa	26.63:	83:	437:	139:	330:	519:
Michigan	3.25:	50:	81:	81:	50:	131:
Minnesota	43.95:	78:	124:	190:	291:	481:
Montana	10.13:	2:	4:	5:	2:	7:
Nebraska	28.53:	74:	110:	85:	314:	399:
North Dakota	31.90:	39:	0:	30:	94:	124:
Ohio	2.00:	13:	0:	24:	1:	25:
South Dakota	29.42:	43:	51:	35:	212:	247:
Wisconsin	13.01:	211:	646:	376:	656:	1,032:
Wyoming	1.70:	1:	0:	1:	1:	2:
Total	234.60:	1,333:	1,730:	1,553:	2,681:	4,534:

SECOND SURVEY, BUSHES AND SEEDLINGS, January 1, 1922, to December 31, 1927

Table 8. Data showing, by States, the number of barberry bushes and seedlings found and destroyed in second survey in the barberry eradication campaign from January 1, 1922, to December 31, 1927

State	Number of bushes found--			Number of bushes destroyed			Number of seedlings--					
	In cities	In country	and towns	Escaped	Total	Dug	Treated	Total	Found	Dug	Treated	Total
Colorado	106	456	521	627	16	611	627	4,356	0	4,356	0	4,356
Illinois	2,836	95,673	97,194	100,080	22,364	77,716	100,080	43,821	33,702	10,119	43,821	43,821
Indiana	677	211	495	1,172	713	451	1,169	3,206	1,947	1,259	3,206	3,206
Iowa	561	4,395	8,439	9,000	1,126	7,872	8,998	116,026	4,029	111,997	116,026	116,026
Michigan	99	668	770	869	275	594	869	985	935	50	985	985
Minnesota	470	2,067	4,915	5,335	1,767	3,618	5,385	3,928	634	3,294	3,928	3,928
Montana	2	77	32	34	74	9	83	29	29	0	29	29
Nebraska	522	3,047	5,730	6,252	1,492	4,760	6,252	7,316	4,061	3,255	7,316	7,316
North Dakota	237	0	1,796	2,033	343	1,690	2,033	40	0	40	40	40
Ohio	59	0	31	90	88	2	90	0	0	0	0	0
South Dakota	379	370	1,892	2,271	326	1,945	2,271	1,389	1,126	263	1,389	1,389
Wisconsin	845	58,430	59,319	60,164	18,225	41,939	60,164	102,983	47,510	55,473	102,983	102,983
Wyoming	1	0	33	34	1	33	34	0	0	0	0	0
Total	6,344	165,944	181,217	188,061	46,815	141,240	188,055	284,079	93,973	190,106	284,079	284,079

RESURVEY, PROPERTIES, January 1 to December 31, 1927

Table 9. Data showing, by States, the number of properties on which sprouting bushes and seedlings were found and destroyed on resurvey in the barberry eradication campaign during the calendar year January 1 to December 31, 1927

State	Number of properties on which sprouting bushes were found --			Total number of properties : cleared of sprouting bushes:			Number of properties on which seedlings were --			
	In country cities & country	Total in cities & country	bushes :	Dug	Treated	Total	Found	Dug	Treated	Total
Colorado	2:	0:	:	2:	0:	:	1:	0:	1:	1
Illinois	28:	76:	:	60:	70:	130:	38:	28:	10:	38
Indiana	5:	0:	:	12:	0:	12:	1:	2:	0:	2
Iowa	35:	52:	:	30:	128:	158:	7:	3:	4:	7
Michigan	0:	0:	:	0:	0:	0:	4:	4:	0:	4
Minnesota	7:	29:	:	22:	38:	60:	21:	9:	12:	21
Montana	0:	0:	:	0:	0:	0:	0:	0:	0:	0
Nebraska	5:	4:	:	0:	26:	26:	0:	0:	0:	0
North Dakota	25:	0:	:	5:	43:	48:	0:	0:	0:	0
Ohio	0:	0:	:	0:	0:	0:	0:	0:	0:	0
South Dakota	0:	1:	:	0:	7:	7:	6:	4:	2:	6
Wisconsin	0:	16:	:	6:	20:	26:	11:	6:	5:	11
Wyoming	0:	0:	:	0:	0:	0:	0:	0:	0:	0
Total	107:	173:	:	137:	332:	469:	89:	56:	34:	90

RESURVEY, SPROUTING BUSHES AND SEEDLINGS, January 1 to December 31, 1927

Table 10. Data showing, by States, the number of sprouting bushes and seedlings found and destroyed on resurvey in the barberry eradication campaign during the calendar year January 1 to December 31, 1927

State	Number of sprouting bushes found--			Number of sprouting bushes destroyed:			Number of seedlings --				
	In cities and towns:	In country:	Escaped:	Total:	Dug	Treated	Total	Found	Dug	Treated	Total
Colorado	8:	0:	0:	8:	0:	0:	8:	250:	0:	250:	250
Illinois	229:	633:	922:	1,151:	482:	669:	1,151:	6,310:	6,341:	469:	6,310
Indiana	36:	0:	6:	42:	345:	0:	346:	1,198:	128:	1,095:	1,223
Iowa	135:	1,786:	2,855:	2,990:	135:	2,855:	2,990:	375:	61:	314:	375
Michigan	0:	0:	0:	0:	0:	0:	0:	435:	435:	0:	435
Minnesota	13:	173:	242:	255:	56:	199:	255:	319:	81:	238:	319
Montana	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	0
Nebraska	67:	9:	133:	205:	0:	205:	205:	0:	0:	0:	0
North Dakota	149:	0:	145:	294:	23:	266:	294:	0:	0:	0:	0
Ohio	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	0
South Dakota	0:	20:	77:	77:	12:	65:	77:	390:	323:	67:	390
Wisconsin	0:	362:	377:	377:	25:	352:	377:	16,895:	2,520:	14,375:	16,895
Wyoming	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	0
Total	637:	3,483:	5,262:	5,999:	1,092:	5,111:	6,203:	26,672:	9,539:	16,508:	26,697

RESURVEY, PROPERTIES, April 1, 1918, to December 31, 1927

Table 11. Data showing, by States, the number of properties on which sprouting bushes and seedlings were found and destroyed on resurvey in the barberry eradication campaign from April 1, 1918, to December 31, 1927

State	Number of properties on which sprout--										Number of properties on which seed-			
	ing bushes were found--										lings were--			
	: In country : Total in : cities & : Dug : Treated : Total : Found : Dug : Treated : Total										Destroyed			
	In cities:	Having :	and towns:	escaped:	Total :	country :								
	: bushes :										: : : :			
Colorado	1,444:	114:	193:		1,637:	1,413:	219:	1,637:	103:	19:	84:	103		
Illinois	470:	471:	569:		1,339:	632:	707:	1,339:	425:	344:	81:	425		
Indiana	183:	136:	270:		453:	317:	134:	451:	49:	16:	33:	49		
Iowa	378:	381:	1,134:		1,512:	738:	774:	1,512:	282:	145:	137:	282		
Michigan	146:	114:	289:		435:	375:	60:	435:	195:	191:	4:	195		
Minnesota	743:	641:	1,343:		2,091:	1,652:	439:	2,091:	2,262:	2,123:	139:	2,262		
Montana	123:	6:	56:		179:	163:	16:	179:	23:	20:	3:	23		
Nebraska	216:	30:	434:		650:	363:	287:	650:	5:	4:	1:	5		
North Dakota	320:	0:	246:		566:	248:	318:	566:	6:	0:	6:	6		
Ohio	1,421:	231:	1,021:		2,442:	2,104:	338:	2,442:	716:	531:	165:	716		
South Dakota	341:	36:	345:		686:	513:	173:	686:	85:	40:	45:	85		
Wisconsin	913:	671:	972:		1,885:	1,350:	531:	1,881:	255:	174:	111:	255		
Wyoming	32:	0:	10:		42:	31:	7:	38:	7:	7:	0:	7		
Total	6,730:	2,881:	7,137:		13,917:	9,904:	4,003:	13,907:	4,443:	3,634:	509:	4,443		

RESURVEY, SPROUTING BUSHES AND SEEDLINGS, April 1, 1913, to December 31, 1927

Table 12. Data showing, by States, the number of sprouting bushes and seedlings found and destroyed on resurvey in the barberry eradication campaign from April 1, 1913, to December 31, 1927

State	Number of sprouting bushes found--				Number of sprouting bushes destroyed--				Number of seedlings--			
	In cities:		In country:		In cities:		In country:		Found:		Destroyed:	
	and towns:	Escaped:	Total:	Total:	and towns:	Escaped:	Total:	Total:	Dug:	Treated:	Dug:	Treated:
Colorado	3,335:	2,023:	3,160:	6,995:	5,156:	1,839:	6,995:	3,922:	712:	3,210:	3,922:	3,922
Illinois	5,045:	8,535:	17,543:	22,593:	10,405:	12,183:	22,593:	581,650:	405,334:	176,266:	531,650:	531,650
Indiana	1,565:	16,371:	18,316:	19,381:	17,933:	1,941:	19,879:	5,494:	847:	4,647:	5,494:	5,494
Iowa	4,144:	9,991:	26,797:	30,941:	15,915:	15,026:	30,941:	53,023:	23,835:	29,188:	53,023:	53,023
Michigan	524:	1,194:	2,413:	2,942:	2,231:	711:	2,942:	607,869:	547,784:	60,085:	607,869:	607,869
Minnesota	14,052:	17,591:	37,074:	51,126:	40,746:	10,330:	51,126:	23,416:	4,483:	23,933:	28,416:	28,416
Montana	3,557:	5:	1,647:	5,204:	5,070:	134:	5,204:	1,069:	399:	670:	1,069:	1,069
Nebraska	6,239:	258:	10,553:	16,792:	12,564:	4,228:	16,792:	469:	431:	38:	469:	469
North Dakota	1,003:	0:	1,405:	2,403:	309:	2,099:	2,403:	100:	0:	100:	100:	100
Ohio	5,666:	8,046:	12,276:	17,942:	13,071:	4,871:	17,942:	362,585:	111,527:	251,053:	362,535:	362,535
South Dakota	20,980:	5,304:	22,122:	43,102:	36,630:	6,472:	43,102:	9,495:	6,817:	2,678:	9,495:	9,495
Wisconsin	11,244:	75,991:	80,953:	92,202:	19,465:	72,556:	92,021:	1,320,833:	139,461:	1,181,377:	1,320,833:	1,320,833
Wyoming	546:	0:	29:	575:	475:	21:	496:	53:	53:	0:	53:	53
Total	78,400:	145,809:	234,303:	312,703:	179,975:	132,466:	312,441:	2,979,983:	1,246,733:	1,733,250:	2,979,983:	2,979,983

CHEMICAL TREATMENT, September 1, 1921, to December 31, 1927

Table 14. Data showing, by States, the number of properties on which barberry bushes and sprouting barberry bushes were treated with chemicals, and the number of bushes, sprouting bushes, and seedlings treated from September 1, 1921, to December 31, 1927

State	Number treated--										Total
	With salt	With sodium arsenite	With kerosene	Proper-	Proper-	Seed-	Seed-	Proper-	Proper-		
	ties	Bushes	Seedlings	ties	ties	Bushes	lings	ties	ties	Bushes	Seedlings
Colorado	336	3,042	7,316	0	0	8	83	0	344	3,125	7,316
Illinois	2,596	197,093	1,703,493	34	839	5	1,169	0	2,635	199,101	1,703,493
Indiana	647	100,126	12,441	0	0	27	154	43	674	100,280	12,484
Iowa	1,790	48,547	154,746	0	0	27	1,294	3	1,817	49,841	154,749
Michigan	1,493	217,850	1,748,919	239	8,594	29,911	137,621	97,638	1,869	288,631	1,876,468
Minnesota	808	19,874	31,284	25	85	102	47	30	839	20,006	31,416
Montana	80	1,575	2,564	0	0	1	25	200	81	1,600	2,764
Nebraska	448	8,256	9,483	0	0	257	2,975	836	705	11,231	10,319
North Dakota	454	5,356	143	21	67	0	0	0	475	5,423	143
Ohio	1,463	133,241	1,357,494	10	1,069	59,300	282,111	86,534	1,755	145,417	1,503,328
South Dakota	585	18,250	3,604	0	0	8	13	16	593	18,263	3,620
Wisconsin	1,568	159,051	1,217,281	350	5,824	1,702	1	0	1,919	164,876	1,218,983
Wyoming	9	56	0	0	0	0	0	0	9	56	0
Total	12,277	912,317	6,248,768	679	16,478	91,015	759,79,055	185,300	13,715	1,007,850	6,525,083

CHEMICALS, QUANTITIES USED, January 1 to December 31, 1927

Table 15. Data showing, by States, quantities of chemicals used in the barberry eradication campaign from January 1 to December 31, 1927

State	Salt (Tons)		Sodium arsenite (Gals.)		Kerosene (Gallons)	
	Furnished by--		Furnished by--		Furnished by--	
	Property: State	Conference:	Total: Conference:	F. G. Rust: U.S.D.A.: Total:	Owner: U.S.D.A.:	Total
	Owner	Agency: P. G. Rust: U.S.D.A.				
Colorado	0	0	1.98:	1.98:	0	0
Illinois	0	0	62.42:	62.42:	0	0
Indiana	0	0	1.74:	1.74:	0	80
Iowa	.10	0	39.66:	39.76:	0	0
Michigan	0	0	169.45:	169.45:	0	0
Minnesota	.20	0	3.39:	3.59:	0	4
Montana	0	0	.52:	.52:	0	30
Nebraska	.025	0	.36:	.33:	0	1,112.5
North Dakota	2.5	0	.2:	2.70:	0	0
Ohio	.02	423.32:	.87:	429.21:	12*	53
South Dakota	.02	0	3.14:	3.15:	0	0
Wisconsin	0	73.15:	.50:	73.65:	0	0
Wyoming	0	0	0	0	0	0
Total	2.865:	506.47:	0	284.23:	793.56:	1,284.5

*Furnished by State

CHEMICALS, QUANTITIES USED, September 1, 1921, to December 31, 1927

Table 16. Data showing, by States, quantities of chemicals used in the barberry eradication campaign from September 1, 1921, to December 31, 1927

	Salt (tons)		Sodium Arsenite (Gals.)		Kerosene (Gallons)			
	Furnished by--		Furnished by--		Furnished by--			
State	Property: State	Conference:	Total	Conference:	Total	Owner	U.S.D.A.	Total
	owner	agency	F. G. Rust:	U.S.D.A.:	I. G. Rust:	U.S.D.A.:	Total	
Colorado	0	0	7.14:	7.14:	0	0	80.0	80.0
Illinois	.75:	55.78:	31.0:	376.49:	464.02:	77.0:	124	124
Indiana	.83:	0	0	60.19:	61.02:	0	212	212
Iowa	44.19:	0	20.69:	132.24:	197.12:	0	404.25:	314.50
Michigan	.03:	0	8.49:	426.78:	435.30:	175.6:	129.3:	304.9:
Minnesota	3.03:	.84:	9.21:	44.28:	57.41:	0	23.25:	23.25:
Montana	.12:	0	0	5.57:	5.69:	0	0	30
Nebraska	.15:	0	8.55:	19.59:	28.29:	0	0	151.5
North Dakota	17.13:	5	0	5.08:	27.21:	7	0	0
Ohio	3.04:	770.80:	0	24.24:	798.08:	16.2:	30.1:	46.3
South Dakota	14.39:	0	17.85:	12.93:	45.17:	0	0	5,194*
Wisconsin	.25:	252.97:	70	25.79:	349.01:	408	190	598
Wyoming	.05:	0	0	.16:	.21:	0	0	.375b/
							0	0
Total	84.01:	1,035.39:	165.79:	1,140.48:	2,475.67:	599.8:	456.29:	1,055.37:
							5,749.75:	17543.875:
								23298.625

a/10 gallons of drip oil

b/carbon bisulphide

* 4,915 gallons furnished by State

GRAND SUMMARY, ORIGINAL BUSHES, SPROUTING BUSHES, AND SEEDLINGS, 1918 to 1927

Table 17. Data showing, by States, the number of bushes, sprouting bushes, and seedlings found and destroyed in all surveys in the barberry eradication campaign, April 1, 1918, to December 31, 1927

State	Original bushes		Sprouting bushes		Seedlings		Grand Total	
	Found	Destroyed	Found	Destroyed	Found	Destroyed	Found	Destroyed
Colorado	25,210:	25,206:	6,995:	6,995:	8,028:	8,028:	40,233:	40,229:
Illinois	385,577:	385,577:	22,593:	22,593:	2,167,293:	2,167,293:	2,575,463:	2,575,463:
Indiana	197,472:	197,466:	19,881:	19,879:	18,768:	18,768:	236,121:	236,113:
Iowa	809,403:	809,397:	30,941:	30,941:	187,116:	187,116:	1,027,460:	1,027,454:
Michigan	668,007:	667,101:	2,942:	2,942:	3,321,590:	3,321,590:	3,992,539:	3,991,633:
Minnesota	790,510:	790,510:	51,126:	51,126:	56,836:	56,836:	898,472:	898,472:
Montana	11,962:	11,951:	5,204:	5,204:	19,223:	19,223:	36,389:	36,378:
Nebraska	98,425:	98,425:	16,792:	16,792:	15,628:	15,628:	130,845:	130,845:
North Dakota	23,227:	23,227:	2,403:	2,403:	293:	293:	25,928:	25,928:
Ohio	391,913:	391,191:	17,942:	17,942:	1,627,863:	1,627,863:	2,037,718:	2,036,996:
South Dakota	60,891:	60,891:	43,102:	43,102:	27,732:	27,732:	131,725:	131,725:
Wisconsin	3,446,096:	3,445,504:	92,202:	92,021:	1,396,413:	1,393,127:	4,934,711:	4,930,652:
Wyoming	4,176:	4,007:	575:	496:	53:	53:	4,804:	4,556:
Total	6,912,569:	6,910,453:	312,703:	312,441:	8,846,836:	8,843,550:	16,072,403:	16,066,444:

GRAND SUMMARY BY YEARS, ORIGINAL BUSHES, SPROUTING BUSHES, AND SEEDLINGS, 1918 to 1927

Table 13. Data showing, by calendar years, the total numbers of original bushes, sprouting bushes, and seedlings found and destroyed in all surveys in the barberry eradication campaign, from April 1, 1918, to December 31, 1927

Year	Original bushes		Sprouting bushes		Seedlings		Totals	
	Found	Destroyed	Found	Destroyed	Found	Destroyed	Found	Destroyed
1918	1,842,239	1,690,475	1,996	1,996	500	500	1,844,735	1,692,971
1919	2,096,063	2,025,389	17,874	17,874	3,500	3,500	2,117,437	2,046,763
1920	1,506,007	518,315	33,148	33,148	1,500	1,500	1,540,655	552,963
1921	175,662	209,647	27,697	27,697	18,557	18,557	221,916	255,901
1922	209,397	729,721	64,352	63,883	69,733	69,733	343,482	863,337
1923	233,161	251,013	106,700	106,145	3,665,581	3,610,681	4,005,442	3,967,839
1924	295,814	388,632	21,852	21,850	847,771	844,485	1,165,437	1,254,967
1925	142,550	149,822	17,036	17,141	701,796	754,505	861,382	921,468
1926	204,530	723,580	16,149	16,504	2,062,689	2,064,805	2,283,368	2,804,889
1927	207,446	223,859	5,899	6,203	1,475,209	1,475,284	1,688,554	1,705,346
Totals	6,912,869	6,910,453	312,703	312,441	8,846,836	8,843,550	16,072,408	16,066,444

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